

We Claims:

1. A detector system for indicating the presence of an object, the combination comprising:

a sonic beam producer for producing a sonic beam at a high frequency  $\omega_0$  which is directed at the object;

5 an amplitude modulator for supplying a signal to the sonic beam producer at the high frequency  $\omega_0$  which is modulated in amplitude at a modulation frequency; and

a detector for receiving a sonic wave produced at the modulation frequency by the object and the detector

10 having means for indicating the presence of the object in response to the received sonic wave.

2. The detector system as recited in claim 1 in which the modulation frequency is within the audible hearing range of humans and the detector indicates its presence by producing an audible sound.

3. The detector system as recited in claim 1 in which the modulation frequency is swept through a range of frequencies such that the frequency of the sonic wave is also swept through a range of frequencies.

4. The detector system as recited in claim 1 in which the object is located within a human subject and the sonic beam producer and the detector are located outside the human subject.

5. A detector system for indicating the mechanical characteristics of an object, the combination comprising:

a sonic beam producer for producing a sonic beam at a high frequency  $\omega_0$  which is directed at the object;

5 an amplitude modulator for supplying a signal to the sonic beam producer at the high frequency  $\omega_0$  which is modulated in amplitude to produce a force in the object corresponding to the modulating signal; and

means for detecting motion in the object caused by the force.

6. The detector system as recited in claim 5 in which the means for detecting is an ultrasonic Doppler system.

7. The detector system as recited in claim 5 in which the means for detecting is a nuclear magnetic resonance system.

8. The detector system as recited in claim 5 in which the frequency of the modulating signal is varied over a range of frequencies such that the frequency of the force is also varied over a range of frequencies.

9. The detector system as recited in claim 5 in which the object is located within a human subject and the sonic beam producer and the means for detecting are located outside the human subject.

10. An imaging system which comprises:  
a sonic beam producer for producing a sonic beam at a high frequency  $\omega_0$  which is directed at the object to be imaged;
- 5 an amplitude modulator for supplying a signal to the sonic producer at the high frequency  $\omega_0$  which is modulated in amplitude at a modulation frequency;
- means for moving the sonic beam to scan its focal point over a region in the object to be imaged;
- 10 a detector for receiving a sonic wave produced at the modulating frequency by the object as it is scanned and producing an output signal indicative of the amplitude of the sonic wave; and
- a display for receiving the output signal and
- 15 producing an image indicative of the amplitude of the sonic wave emanating from locations in said region.

11. The imaging system as recited in claim 10 in which the object is located within a human subject and the imaging system is located outside the human subject.

12. The imaging system as recited in claim 10 in which the modulating frequency is changed over a range of values as the focal point scans the region to be imaged, and the detector receives the sonic waves produced at the corresponding frequencies.

13. A regeneration system for projecting an audio signal to a location in an object, the combination comprising:

5 a sonic beam producer for producing a high frequency sonic beam that passes into the object and to the location; and

an amplitude modulator for supplying a signal to the sonic beam producer at the high frequency which is modulated in amplitude with the audio signal;

10 whereby the modulated sonic beam produces a force on the object at the location that varies as a function of the audio signal, and whereby said force reproduces the audio signal through vibration of said object.

14. The regeneration system as recited in claim 13 in which the object is an animal.

15. The regeneration system as recited in claim 13 in which the object is a body of water.

16. The regeneration system as recited in claim 13 in which the object is a room and the sonic beam passes through air in the room.

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